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CONTACT, DUPLICATING AND RESEAU PRINTER

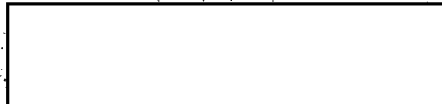
and

HIGH RESOLUTION STEP AND REPEAT PRINTER

TWELFTH MONTHLY LETTER REPORT

JULY 10, 1965

Period: June 1, 1965 to July 1, 1965



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CONTACT DUPLICATING AND RESEAU PRINTER

1.1 Purpose

The overall objective of the current contract is the design, fabrication, test, and delivery in fifteen months of a Photographic Step and Repeat Contact Duplicating and Reseau Printer. Prime design goals are high speed automatic operation, variable format capability, and high resolution with minimum film distortion or damage. The deliverable equipment will be suitable for operational use. The Printer will accommodate films of 70 mm to 9 1/2" width with frame lengths up to 30 inches and will offer operation in the Reseau mode and Selective mode as options.

1.2 Activity of this Report Period

A meeting was held with the technical monitors on June 10, 1965 at the facility to review progress to date and to discuss current technical problems.

The final frame assembly is complete with roll-out transport drawers and drive-module enclosures. Hard-Coat anodize has been applied to all surfaces and appears to be satisfactory for cleanability and durability.

Drive, transport mechanisms, and optical components are currently being fabricated and purchased for mounting in the frame. A single-lamp bread-board with proposed electronic circuitry for automatic exposure control was demonstrated to show linearity of the selected photocell and circuitry. A change in circuitry is proposed to correct a tendency for underexposure at low density level inputs. Since IR output of the GE#1385 lamp leads UV output, a time delay will be incorporated in the automatic exposure control circuitry to allow the lamp to reach full exposure efficiency before being switched off by the photovoltaic cell.

Evenness of illumination and absence of patterning or mottling was demonstrated in a 9" x 9" exposure using a multiple-lamp array. Maximum ΔD measured with a Densichron showed .04 density units which is no greater than the ΔD of the original neutral density filter used as an input. Dodging effectiveness was demonstrated by deactivating one lamp in the center of the array and producing an evenly-blended light area of approximately 2" square on the output print. Maximum ΔD was measured at .63 density units.

A larger array of lamps complete with the selected automatic exposure control circuitry will now be fabricated for final testing before inclusion of the entire system in the final Printer.

Not so. See Mo. Report No. 1, page 3, para 1.5.9
A potential problem is the new requirement of sensing frame edges on positives rather than negatives. [] is preparing a bread-board frame edge detector assembly which will be forwarded to the monitors and evaluated with "typical" films used in their facility.

*Del'd. STAT
at Ray on 14 Jul.
to us on 29 Jul 65*

It is expected that a lamp calibration device will be supplied with the Printer to calibrate lamps periodically for uniform output. The device, consisting basically of a photocell-and-meter, will also be used each time a lamp is replaced in the array. A simple potentiometer adjustment will correct the lamp for variations in initial output intensity.

All details concerning ruling and nomenclature of the Reseau Grid platen have been resolved by a letter from the technical monitor dated June 4, 1965.

STAT The vendor, [] is now proceeding with fabrication and ruling of two Reseau Grid platens and two clear platens. Agreement with the monitors has also been reached for purchase of two sets of binding frames so that each platen will be supplied complete with frame and ready for use. The

frame drawings are complete and will be ordered as soon as minor details are resolved in the area of locator pins for Réseau printing.

An Industrial Design rendering of the Pre-View and Punch Station has been completed in correlation with the existing optical-mechanical design drawings. Functions and operational sequences have been defined, and detailed design and fabrications will commence shortly. The philosophy of achieving punching and locating accuracy has been detailed in a letter to

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The subject of delayed delivery of the Printer due to a three-month delay in contractual approval of the Design Plan was discussed with the monitors at our last technical meeting. While the intended clean-room facility for the Printer will not be ready until 1966, it is anticipated by the monitors that temporary installation will be made in their present facilities. It was agreed that the separate mounting base for the Printer with utility connections would be pre-delivered to the facility. An up-dated Facility Installation form is being prepared to alert cognizant personnel at the monitor's facility. } what was
} intended?

Following a recent meeting with the Test Plan is being revised in final form for submission to the contracting officer in July.

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1.3 Plans for Next Period

Fabrication and assembly of the final printer will be continued. Breadboard assembly and test of a full 9" x 9" exposure array will commence. Design of the Pre-View and Punch Station will be initiated. The Printer Test Plan will be submitted for approval.

1.4 Problems

Data to be furnished by the technical monitor concerning negative frame separation density variation is required promptly for completion of the transport design.

Ray: Status? "We have 2 weeks. Not satisfactory now (21 Jul 68)." Ray.

A review of program status has been completed, and it presently appears that due to delays incurred for the Design Plan review and approval, the printer delivery will be approximately one month late.

1.5 Documentation

There was no new documentation this month.

1.6 Questions Outstanding

There are no outstanding questions this month.

2.0 HIGH RESOLUTION STEP AND REPEAT PRINTER

2.1 Purpose

The purpose of this effort is to design, fabricate, test, and deliver in twenty months a high precision Step and Repeat Photographic Contact Printer. This Printer will be capable of producing photographic contact prints of the highest possible quality, resolution, and acutance from roll films of width varying from 70 mm to 9 1/2" and in preselected frame lengths from 2 1/4" up to a maximum of 30".

2.2 Activity of this Report Period

Full scale testing of the printer breadboard is in progress.

2.2.1 Exposure Control and Light Source

Fabrication of the high frequency lamp supply and modulator has been completed, and test and debug has started. Preliminary tests

have indicated that the system functions as designed, however, some low frequency flicker has been observed at low lamp currents. The cause for this is being investigated prior to installation of the supply into the breadboard model. Photocells have been installed into the rolling air bag, and after preliminary current levels are determined, the cell outputs will be used to drive the modulator in a full scale exposure control test.

2.2.2 Film Gate and Scan Drive - Rolling Air Bag

Dynamic scan tests were performed this month, and optimum system tuning is in progress. In order to expose the very slow S0-267 film for resolution tests it was necessary to reduce the scan drive to 1/4 of its normal speed. Various constants, such as honeycomb size, slit width, air bag thickness, air pressure, etc. were varied, and resolution values in excess of 400 lines per millimeter were then obtained.

After resolution is optimized, lamp-to-film spacing will be varied to determine optimum dimensions for reduction of honey-comb-pattern effects.

2.2.3 Vacuum Capstan

A new inner core was fabricated to limit the vacuum segment to 70°, and has eliminated the previously mentioned leakage problems. The force produced to transport the film was found to be more than adequate. *life*

A second capstan is being modified by the vendor and will be received in a few days.

A dimpling test was performed, in which various thicknesses of film were permitted to remain stationary over the capstan with full vacuum applied for varying periods of time. No dimpling of any kind was observed.

New-thin base?

2.2.4 Film Transport

One storage loop system, including amplifier is completely operable. Tests with short film runs indicate that the response is satisfactory and as predicted.

The second amplifier was completed and calibrated and is presently undergoing tests with long continuous runs of film. Fixed torsional damping set for fixed pre-determined values has been used to simulate the variable damping that will ultimately be used. Since the response has been as predicted, it now appears that the storage loops may definitely be shortened to approximately 10".

The mechanical design for a photocell frame edge detector utilizing a moving probe was completed; however, a new technique is being investigated which will eliminate the need for the moving probe.

} ?

Various viewer configurations have been studied. The red light viewer concept was eliminated when it was discovered that 5427 film has extended sensitivity to wavelengths into the infrared. While this is no problem under normal handling, continued high intensity red exposure will cause fogging of the film. It now appears certain that the viewer will be external to the gate area, and will utilize white light for viewing.

An early meeting with the technical monitor is contemplated to finalize the viewer design, since it restrains many other areas of the prototype design. A conceptual drawing was prepared by

STAT showing the viewer and control panel at the 6' x 30" face of the machine. While unconventional, it appears to be the most practical arrangement from the standpoint of ease of operation, loading, and maintenance.

OK'd
on 30 June

2.2.5 Other Activities

A progress review meeting was held at Xerox on June 11, 1965 at which time the breadboard was made operational and demonstrated to the technical monitor. Full scale 9 1/2" x 30" duplicate prints were made and resolution target print out on 8430 film was displayed and examined under the microscope. The technical monitor expressed satisfaction at the progress made on the breadboard to date.

Government specification revisions have been tabulated, and upon completion of internal pricing and review, will be submitted to the contracting officer early next month.

Pert programming of the prototype is underway, and indicates that early approval of the Feasibility Study will be required to maintain schedule.

? Oral 30 June 65
On 30 June 65
Is?

2.3 Plans for Next Reporting Period

Continuation of testing of the full scale breadboard will be conducted. Change of Scope items will be submitted to the Contracting Officer.

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2.4 Problems

Lamp flicker at low current levels is presently a problem. The problem of honeycomb patterning of the lamphouse will be studied again when resolution has been optimized. Early design approval of the viewer configuration and approval of the Feasibility Study is vital for program continuity.

2.5 Documentation

Verbal approval of the breadboard and authority to proceed with the prototype was received by phone in a conversation between the technical monitor and [] on June 28, 1965.

*Confirmation
writing*

Paragraph 2.23.6 of the specification revisions was acceptable to [] as submitted by the government.

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2.6 Questions Outstanding

Range of Voltage regulation of the government facility will be determined by the technical monitor.

Bob C.

3.0 STATUS OF FUNDS

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